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USSR SILICATE BRICK INDUSTRY EXPANDS; LACK
OF MACHINERY HAMPERS INTRODUCTION OF NEW METHODS

Silicate brick production continues to rise, but the capacity is not being fully utilized. In the first 6 months of 1952, silicate brick output of plants subordinate to the "Rossilikatkirpich" Trust fell about 35 million short.

In 1952, the silicate brick industry is faced with greater tasks than previously. Plants are called upon to produce 40 percent more brick than in 1951. The construction of new plants is being expanded. For this reason, in 1952 a special main administration, Glavnosilikatkirpich (Main Administration for the Construction of New Silicate Brick Plants) has been established within the Ministry of Construction Materials Industry RSFSR.

Previously, only pure quartz sand of determinable granular composition and containing at least 90 percent silicate was used to make silicate brick. As a result of the research carried on by ROSHIMS (RGPSR Scientific Research Institute of Local Construction Materials) in collaboration with the Stalingrad Silicate Brick Combine and the Yaroslavl', Mytishchi, and Kostroma silicate brick plants, sand containing a considerable amount of clay is now used in silicate brick manufacturing. This has substantially increased the raw material resources of the silicate brick industry.

According to previous standards for lime used in silicate brick manufacturing, magnesium oxide content could not exceed 2 percent. The Ivanovo, Strizhi, and other plants are now using lime containing 9-19 percent magnesium oxide for a raw base. Expecting to receive calcium lime, some of the plants, and especially the Pavlovsk plant, are delaying in converting to the use of local magnesium and hydraulic lime.

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With silicate brick production increased, the ordinary ball mills proved to be inadequate and are now being replaced by dual-chamber mills of type "SM-14" which not only have made it possible to improve lime fineness (residue on net with 4,900 openings per square centimeter is 5-10 percent) but have also made it possible to add other materials, such as clay, tripoli, diatomite, and sand, to the silicate mixture. The use of lime has been reduced while the forming quality of the mixture has been improved.

In enterprises slaking lime by the silo method, lime was usually kept in the silo 6-8 hours. Steam-wetting the mass in the mixer has made it possible to cut the slaking period to 1-2 hours. This latter process has made it possible to use lime containing 10-14 percent and more magnesium oxide; this previously had been considered impossible in silicate brick manufacturing.

The long-employed method of slaking the silicate mixture in cylinders under a steam pressure of 4-6 atmospheres for 40-60 minutes has also been changed. The mass is now steam heated in a cylinder 5-8 minutes at a pressure of 1.5-2 atmospheres. The steam is then released and slaking continues through a drain valve. In those plants which use the improved method, the mass-preparing departments have increased their output 50-60 percent.

Recently, sodium sulfide has been added to the silicate mixture, with the objective of intensifying the steaming process of the raw material. This has made it possible to reduce the steaming period to 6 hours. Turnover by autoclaves has increased sharply and the output of brick has been increased considerably. The Koronevo, Lyubertsy, and other plants which have been adding sodium sulfide to the silicate mixture have been successful in achieving greater reductions in steaming periods. The Chapayevsk plant has been using waste from adjacent enterprises as an additive. However, this method is not used widely by other plants. The Lipetsk and Stalingrad silicate brick plants could very easily use clinders and other industrial waste as an additive in their manufacturing process.

The plants were faced with the lack of suitable mixing machinery, but the problem has been eliminated. The experiences at the Tallin "Silikat" Plant, where the mass mixture is worked according to a method of disintegration, has clearly shown that it is quite possible to make greater reductions in the use of lime, and that brick quality can be improved and the turnover by the autoclaves can be increased. The disintegration method of working up the mass mixture averts the formation of occlusions and sluices in the mixture of tripoli, clay, and lime. The plasticity of the mass is increased and forming qualities become improved.

Mass mixture can also be prepared according to the so-called hydration method. The advantage of this method lies in saving electrical energy used to grind the lime, and in dispensing with grinding machinery. However, this method cannot be employed at all USSR plants. During the winter months, plants located in the central and northern part of the USSR are forced to use sand of very low temperature and additives which are frozen in lumps. The Pavlovskiy, Strizhi, Bezhitsa, and other plants whose quarries are worked to subsurface water level are able to obtain raw material which is plasticized as high as 9 percent. In mixing this type of sand with unslaked lime, the sand can be dried and thawed out during the slaking process.

Silicate brick manufacturing is constantly being mechanized. However, there is one important operation which is still done by hand. This involves removing the raw brick from the press table and placing it in the steaming carts. Until recently, this process could not be mechanized because of the product's low durability (1.5-2 kilograms per square centimeter). However, by using such plasticized additives as clay or tripoli, it is

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possible to increase the durability of the raw product. Tests made at plants have shown that if the mixture contains 25-36 percent clay or tripoli, the raw product from the machine becomes more durable, increasing up to 10-12 kilograms per square centimeter.

If the hydration method is employed, the addition of clay or tripoli, in the above-mentioned proportion requires the construction of special grinding and drying apparatus. This can lead to many disadvantages. For this reason, it is felt that both the lime and the additives should be ground in the ball mill at the same time. The mixture would then be worked in the disintegrator after passing through the silo or slaking cylinder. This method would raise the raw product's durability to 20-25 kilograms per square centimeter, which is necessary if the raw product is to be removed from the press table by mechanized facilities.

However, plants subordinate to the "Rossilikatkirpich" Trust have been unable to profit by the many advantages offered by the disintegrating method of preparing the mass mixture, because of the lack of necessary machinery. Not one machine has been supplied to these plants. Glavstroomash (Main Administration for the Production of Building Materials Machinery) and the supplying organizations have violated the delivery dates called for in the order of the Ministry of Construction Materials Industry USSR.

The planning organizations have delayed making up the plans for the installation of the disintegrators. The plants were supplied with these plans only recently and Glavstroomash now is responsible for putting these machines in operation.

The employment of the disintegrating method of working the mass mixture makes it possible to manufacture a wide variety of highly durable silicate products. By reinforcing these products, it will be possible to replace many reinforced concrete products. The reinforced silicate products will be both cheaper and lighter in weight as well as more durable.

The manufacture of highly durable silicate products is hampered by the lack of proven methods for their manufacture. The Tallin "Quartz" Plant has not been able to accomplish the forming process by mechanized means because of the lack of necessary machinery.

The silicate brick industry is undergoing rapid expansion. In the next few years, more than 20 silicate brick plants are expected to be built in the RSFSR alone. -- M. Lapovok, Chief Engineer of "Rossilikatkirpich" Trust.

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